



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/628,085

07/24/2003

Dennice F. Gayme

H0005645- -1170

3521

128 7590 05/12/2009  
HONEYWELL INTERNATIONAL INC.  
101 COLUMBIA ROAD  
P O BOX 2245  
MORRISTOWN, NJ 07962-2245

EXAMINER

MANCHO, RONNIE M

ART UNIT

PAPER NUMBER

3664

MAIL DATE

DELIVERY MODE

05/12/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/628,085	<b>Applicant(s)</b> GAYME ET AL.	
	<b>Examiner</b> RONNIE MANCHO	<b>Art Unit</b> 3664	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 February 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 2 5-79-1121 25 26 28-31 33 34 and 36-45 is/are pending in the application.
- 4a) Of the above claim(s) 2, 21, 25 and 28-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 5-7, 9-11, 31, 33, 34 and 36-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Art Unit: 3664

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 5-7, 9, 10, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over McBrien et al (2003/0139860) in view of Wikipedia encyclopedia (copy is labeled as "A" and was attached in last office action)

Regarding claim 1, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose a fault detection system for detecting faults in a turbine engine, the fault detection system comprising:

a sensor data processor (12, 14, 16; sec. 0050), the sensor data processor configured to receive sensor data (*see the ten raw readings QS RAW, NP RAW, NR RAW, NH RAW, etc; sec. 0050, 0051 from sensors of a turbine engine*) from the turbine engine and generate residuals (*the ten raw sensor data are filtered or conditioned thus forming residuals e.g. QS, NP, NR, NH, etc sec. 0050, 0051*) from the sensor data and determine a rate of change of the residuals (*i.e. horse power which constitutes rate of change of work done is determined for the residuals to produce rate of change of the residuals viz HP NR, HP NP, HP NH, see figs. 5A-C, sec. 0051-0057 which details the process taking place in the processors*), the residuals (*e.g. QS, NP, NR, NH, etc sec. 0050, 0051*) from the sensor data (*raw readings QS RAW, NP RAW, NR RAW, NH RAW, etc*) and the rate of change of the residuals (*rate of change of the residuals viz HP NR, HP NP, HP NH, see figs. 5A-C, sec. 0051-0057*) providing an augmented data set; and

Art Unit: 3664

a fuzzy logic inference system 30, the fuzzy logic inference system configured to receive the augmented data set (the data from units 12, 14, 16 is passed through units 18, 20 and then to the fuzzy logic system 30; fig. 3), and wherein the fuzzy logic inference system 30 includes a plurality of membership functions (32, 36, , etc), and wherein each of the plurality of membership functions is associated with at least one data type in the residuals from the sensor data and rate of change of the residuals, and wherein the fuzzy logic system is configured to fuzzify the residuals from the sensor data and rate of change of the residuals using the plurality of membership functions and analyze the residuals from the sensor data and rate of change of the residuals to determine a likelihood that a fault has occurred in the turbine engine (abstract; sec. 0048, 0066-0068; when the ratio is above a or below a given number, it is determined that there is a likely hood or probability that a fault is in the engine).

McBrien teaches *rate of change* of residuals because in McBrien sensor data is sampled, filtered and converted into a horse power. That is Wikipedia document teaches that power is a rate at which work is done with respect to time. That is the rate of change of work with respect to time is power. Therefore after reading Wikipedia it would have been obvious to one of ordinary skill in the art, at the time the invention was made, that the sensor data converted to power in McBrien constitute rate of change or residual data.

Regarding claim 5, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the system of claim 1 wherein the sensor data processor is configured to compute a margin (reference value, sec. 0051) for the sensor data.

Art Unit: 3664

Regarding claim 6, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the system of claim 1 wherein the sensor data comprises engine speed data, fuel flow data and exhaust gas temperature data (sec. 0051-0054).

Regarding claim 7, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the system of claim 1, wherein the sensor data processor is configured to receive exhaust gas temperature data and wherein the sensor data processor is further configured to determine exhaust gas temperature margin data corresponding to a difference between the exhaust gas temperature data and a maximum safe temperature.

Regarding claim 9, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the system of claim 1 wherein the fuzzy logic inference system includes a plurality of rules, and wherein the fuzzy logic system is configured to evaluate the fuzzified residuals from the sensor data and rate of change of the residuals according to the plurality of rules.

Regarding claim 10, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the system of claim 9 wherein the fuzzy logic inference system is further configured to aggregate outputs of the plurality of rules and defuzzifies the aggregated output for input into a diagnostic system.

Regarding claim 11, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the system of claim 10 wherein sensor data comprises exhaust gas temperature data, engine speed data, and fuel flow data (sec. 0051-0054), and wherein the sensor data processor is configured to generate residuals from the exhaust gas temperature data, engine speed data and fuel flow data (sec. 0051-0054), and wherein the sensor data processor is configured to determine a rate of change of the residuals (see sections referenced in claim 1) from the exhaust gas temperature data, engine speed data, and fuel flow data, and wherein the sensor data processor is configured to determine

Art Unit: 3664

a margin (reference value, sec. 0051) for the exhaust temperature data corresponding to a difference between the exhaust gas temperature data and a maximum safe exhaust gas temperature for the turbine engine.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 31, 33, 34, 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over McBrien et al (20030139860) in view of Martucci et al (6289274) and further in view of Wikipedia document.

Regarding claim 31, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose an apparatus comprising:

a processor (14, 16; sec. 0050);

a fault detection program executed by the processor (14, 16; abstract, sec. 0050-0054).

McBrien et al disclose programs, but does not disclose a memory storing the programs. However, Martucci et al teach of a memory coupled to a processor, wherein the memory comprises a fault detection program residing in the memory and being executed by a processor (14; col. 4, lines 60 to col. 5, line2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McBrien for the purpose of storing executable fuzzy programs on a memory;

Art Unit: 3664

Thus, McBrien as modified by Matucci et al disclose the fault detection program including:

a sensor data processing program (sec. 0050-0054, McBrien), the sensor data processing program configured to receive sensor data (*see the ten raw readings QS RAW, NP RAW, NR RAW, NH RAW, etc; sec. 0050, 0051 from sensors of a turbine engine, McBrien*) from a turbine engine and generate residuals (*the ten raw sensor data are filtered or conditioned thus forming residuals e.g. QS, NP, NR, NH, etc sec. 0050, 0051, McBrien*) from the sensor data and determine a rate of change of the residuals (*i.e. horse power which constitutes rate of change of work done is determined for the residuals to produce rate of change of the residuals viz HP NR, HP NP, HP NH, see figs. 5A-C, sec. 0051-0057 which details the process taking place in the processors, McBrien*), the residuals (*e.g. QS, NP, NR, NH, etc sec. 0050, 0051*) from the sensor data (*raw readings QS RAW, NP RAW, NR RAW, NH RAW, etc, McBrien*) and the rate of change of the residuals (*rate of change of the residuals viz HP NR, HP NP, HP NH, see figs. 5A-C, sec. 0051-0057, McBrien*) providing an augmented data set; and

a fuzzy logic inference program 30, the fuzzy logic inference program configured to receive the augmented data set (the data from units 12, 14, 16 is passed through units 18, 20 and then to the fuzzy logic system 30; fig. 3, McBrien), and wherein the fuzzy logic inference program 30 includes a plurality of membership functions (32, 36, , etc, McBrien), and wherein each of the plurality of membership functions is associated with at least one data type in the residuals from the sensor data and rate of change of the residuals, and wherein the fuzzy logic program is configured to fuzzify the residuals from the sensor data and rate of change of the residuals using the plurality of membership functions and analyze the residuals from the sensor

Art Unit: 3664

data and rate of change of the residuals to determine a likelihood that a fault has occurred (*abstract; sec. 0048, 0066-0068; when the ratio is above a or below a given number, it is determined that there is a likely hood or probability that a fault is in the engine, McBren*).

McBrien in view of Matucci teach *rate of change* of residuals because in McBrien sensor data is sampled, filtered and converted into a horse power. That is Wikipedia document teaches that power is a rate of doing work with respect to time. That is the rate of change of work with respect to time is power. Therefore after reading Wikipedia it would have been obvious to one of ordinary skill in the art, at the time the invention was made, that the sensor data converted to power in McBrien constitute rate of change or residual data.

Regarding claim 33, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the apparatus of claim 31 wherein the sensor data comprises engine speed data, fuel flow data and exhaust gas temperature data (sec. 0050-0054).

Regarding claim 34, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the apparatus of claim 31 wherein the sensor data processing program is configured to receive exhaust gas temperature data and wherein the sensor data processing program is further configured to determine exhaust gas temperature margin data corresponding to a difference between the exhaust gas temperature data and a selected maximum safe exhaust gas temperature for the turbine engine.

Regarding claim 36, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the apparatus of claim 31 wherein the fuzzy logic inference program includes a plurality of rules, and wherein the logic system is configured to evaluate the fuzzified residuals from the sensor data and rate of change of the residuals according to the plurality of rules.



Art Unit: 3664

Regarding claim 37, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the apparatus of claim 36 wherein the fuzzy logic inference program is configured to further aggregate outputs of the plurality of rules and defuzzify the aggregated output for input into a diagnostic system.

Regarding claims 38 McBrien et al (abstract, figs. 1, 3-7; pages 2-5) disclose the apparatus of claim 31, wherein the sensor data comprising exhaust gas temperature data, engine speed data, and fuel flow data, and wherein the sensor data processing program is configured to generate residuals from the exhaust gas temperature data, engine speed data, and fuel flow data (sec. 0050-0054), and wherein the sensor data processing program is configured to determine a rate of change of the residuals (see sections cited in claim 31) from the exhaust gas temperature data, engine speed data, and fuel flow data, and wherein the sensor data processing program is configured to determine a margin for the exhaust gas temperature data corresponding to a difference between the exhaust gas temperature data and a maximum safe exhaust gas temperature for the turbine engine.

5. Claims 39-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over McBrien et al (20030139860) in view of Brown et al (5377112).

Regarding claim 39, McBrien et al (abstract, figs. 1, 3-7; pages 2-5) a fault detection system for detecting faults in a turbine engine, the fault detection system comprising:

a sensor data processor (14, 16; abstract, sec. 0050-0054) the sensor data processor configured to:

receive sensor data from the turbine engine (see QS, NP, NR, etc; sec. 0050, 0051);

Art Unit: 3664

determine a rate of change of sensor data residuals (the filtered or conditioned data, etc are residuals; sec. 0050, 0051); and

a fuzzy logic inference system 30, the fuzzy logic inference system configured to receive the sensor data residuals (the data from units 14, 16 is passed through units 18, 20 and then to the fuzzy logic system 30; fig. 3), and wherein the fuzzy logic inference system 30 includes a plurality of membership functions, and wherein the fuzzy logic system is configured to fuzzify the sensor data residuals using the plurality of membership functions to determine a likelihood that a fault has occurred in the turbine engine (abstract; sec. 0048, 0066-0068; when the ratio is above a or below a given number, it is determined that there is a likely hood or probability that a fault is in the engine).

Although McBrien disclose sensing engine data, they did not particularly disclose exhaust gas temperature data, engine speed data, and fuel flow data. However, Brown et al teach of a turbine engine wherein a sensor data processor (202, col. 3, lines 42-56; figs 1, 2) the sensor data processor configured to”

receive sensor data from the turbine engine the sensor data including exhaust gas temperature data, engine speed data, and fuel flow data (202, col. 3, lines 42-56; col. 9, lines 8-11; figs 1, 2).

generate exhaust gas temperature residuals (implies comparing and taking a difference) by comparing the exhaust gas temperature data to expected values of exhaust gas temperature (abstract, col. 3, lines 42-56)

Art Unit: 3664

generate engine speed residuals (implies comparing and taking a difference) by comparing the engine speed data to expected values of engine speed (abstract, col. 3, lines 42-56);

generate fuel flow residuals (implies comparing and taking a difference) by comparing the fuel flow data to expected values of fuel flow (col. 9, lines 8-11; figs 1, 2).

Thus McBrien as modified by Brown et al disclose a sensor data processor configured to:

determine a rate of change of the exhaust gas temperature residuals;

determine a rate of change of the engine speed residuals;

determine a rate of change of the fuel flow residuals; and

a fuzzy logic inference system, the fuzzy logic inference system configured to receive the exhaust gas temperature residuals, the engine speed residuals, the fuel flow residuals, the rate of change of the exhaust gas temperature, re residuals, the rate of change of the engine speed residuals, and the rate of change of the fuel flow residuals, and wherein the fuzzy logic inference system includes a plurality of membership functions, and wherein the fuzzy logic system is configured to fuzzify the exhaust gas temperature residuals, the engine speed residuals, the fuel flow residuals, the rate of change of the exhaust gas temperature residuals, the rate of change of the engine speed residuals, and the rate of change of the fuel flow residuals using the plurality of membership functions to determine a likelihood that a fault has occurred in the turbine engine.

Art Unit: 3664

Regarding claim 40, McBrien et al (abstract, figs. 1, 3-7; pages 2-5)/Brown et al disclose the system of claim 39 wherein the plurality of membership functions include a low membership function, a medium membership function and a high membership function (see fig. 5, McBrien).

Regarding claim 41, McBrien et al (abstract, figs. 1, 3-7; pages 2-5)/Brown et al disclose the system of claim 40 wherein the low membership function comprises a first sigmoid function, and wherein the medium membership function comprises a trapezoid function, and wherein the high membership function comprises a second sigmoid function.

Regarding claim 42, McBrien et al (abstract, figs. 1, 3-7; pages 2-5)/Brown et al disclose the system of claim 40 wherein the fuzzy logic inference system is configured to fuzzily the exhaust gas temperature residuals, the engine speed residuals, the fuel flow residuals, the rate of change of the exhaust gas temperature residuals, the rate of change of the engine speed residuals and the rate of change of the fuel flow residuals using the plurality of membership functions by generating an aggregated output function from the plurality of membership functions (MCBrien, fig. 5).

Regarding claim 43, McBrien et al (abstract, figs. 1, 3-7; pages 2-5)/Brown et al disclose the system of claim 42 wherein the fuzzy logic inference system is configured to determine a likelihood that a fault has occurred in the turbine engine by determining a centroid of area under the aggregated output function (MCBrien, fig. 5).

Regarding claim 44, McBrien et al (abstract, figs. 1, 3-7; pages 2-5)/Brown et al disclose the system of claim 43 wherein the fault comprises a high pressure spool fault.

Regarding claim 45, McBrien et al (abstract, figs. 1, 3-7; pages 2-5)/Brown et al disclose the system of claim 39 wherein the sensor data processor is configured to determine the rate of

Art Unit: 3664

change of the exhaust gas temperature residuals using a linear fit of the exhaust gas temperature residuals, and wherein the sensor data processor is configured to determine the rate of change of the engine speed residuals using a linear fit of the engine speed residuals, and wherein the sensor data processor is configured to determine the rate of change of the fuel flow residuals using a linear fit of the fuel flow residuals (see fig Brown, figs. 8-12).

### ***Response to Arguments***

6. Applicant's arguments filed 2/06/09 have been fully considered but they are not persuasive.

Applicant further argues that the prior art McBrien et al do not disclose "deviation rate", but instead disclose "deviation ratio". The examiner disagrees and refers applicant to the dictionary definitions submitted in office action dated 6/25/08. The definition indicates that "rate" is a form of "ratio". Therefore, "deviation ratio" is necessary broad enough to encompass "deviation rate". It appears that applicant is confused by the term "ratio"; however, the examiner believes that the definition provided by the dictionary and Wikipedia are sufficient enough for the prior art to read on the claims.

McBrien anticipates a sensor data processing program (sec. 0050-0054, McBrien), the sensor data processing program configured to receive sensor data (*see the ten raw readings QS RAW, NP RAW, NR RAW, NH RAW, etc; sec. 0050, 0051 from sensors of a turbine engine, McBrien*) from a turbine engine and generate residuals (*the ten raw sensor data are filtered or conditioned thus forming residuals e.g. QS, NP, NR, NH, etc sec. 0050, 0051, McBrien*) from the sensor data and determine a rate of change of the residuals (*i.e. horse power which constitutes*

Art Unit: 3664

*rate of change of work done is determined for the residuals to produce rate of change of the residuals viz HP NR, HP NP, HP NH, see figs. 5A-C, sec. 0051-0057 which details the process taking place in the processors, McBrien), the residuals (e.g. QS, NP, NR, NH, etc sec. 0050, 0051) from the sensor data (raw readings QS RAW, NP RAW, NR RAW, NH RAW, etc, McBrien) and the rate of change of the residuals (rate of change of the residuals viz HP NR, HP NP, HP NH, see figs. 5A-C, sec. 0051-0057, McBrien) providing an augmented data set.*

McBrien further shows that the sensor data are mapped as seen in units 45 fig. 5. The graphs therein show a slope, thus a rate of change. It is further noted that the bar chart of fig. 2 shows rate of change of data across the board. It is further noted that McBrien section 0059 analyses deviation ratios of sensor and determines which has the largest deviation, thus a rate of change of sensor data is determined. As already mentioned above and admitted by applicant, “residuals” refers to a difference in compared data. McBrien disclose comparing engine sensed data to a mean thus determining “residuals” as defined by applicant. McBrien also discloses filtering which meets applicant's definition of “residuals” since data is compared and a difference taken in a filtering process. McBrien's filtered data are mapped and a slope therefor shown, thus disclosing a rate of change of sensor data residuals. As already mentioned, McBrien discloses deviation ratio which means deviation rate.

McBrien further teaches *rate of change* of residuals because in McBrien sensor data is sampled, filtered and converted into a horse power deviation ratio. That is Wikipedia document teaches that power is a ratio of work with respect to time. That is the rate of change of work with respect to time is power. Therefore after reading Wikipedia it would have been obvious to one

Art Unit: 3664

of ordinary skill in the art, at the time the invention was made, that the sensor data converted to power in McBrien constitute rate of change or residual data.

Applicant further argues that McBrien does not disclose a fuzzy logic inference system because McBrien discloses "fuzzy logic calculations" which perform calculations relating to bypass, stopping, or enabling the fault detection system. The examiner disagrees and notes that applicant does not provide the particulars of the claimed "fuzzy logic calculations". Thus it appears that applicant is insisting that the reference must recite the exact terms as in the claims. The examiner respectfully notes that MPEP does not require the references to recite the claimed terms in *haec verba*. As admitted by applicant, McBrien discloses a fuzzy logic system. Applicant particularly argues that McBrien does not disclose "membership functions" in the fuzzy logic system. The examiner disagrees and notes that unit 30 of fig. 3 is a fuzzy logic system. Unit 30 is further defined in fig. 4 to show membership functions which refer to the different units (34, 34, 36, the boxes with the mathematical symbols, etc) that make up the fuzzy logic system. As already noted, McBrien determine faults in a turbine engine. Thus McBrien disclose a likelihood that a fault has occurred. McBrien further uses a fuzzy logic inference system including membership functions as already explained. Thus McBrien discloses the claimed limitation.

Applicant further argues generally that the combination of McBrien and Matucci is improper, but does not point out why the combination is improper as a 103 (a) rejection.

Applicant further argues generally that the combination of McBrien and Brown is improper, but does not point out why the combination is improper as a 103 (a) rejection.

Art Unit: 3664

The examiner believes that the 103 rejections are proper for reasons provided above. The rejections thus stand.

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Communication***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RONNIE MANCHO whose telephone number is (571)272-6984. The examiner can normally be reached on Mon-Thurs: 9-5.



Art Unit: 3664

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tran Khoi can be reached on 571-272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ronnie Mancho  
Examiner  
Art Unit 3664

5/10/2009

/KHOI TRAN/  
Supervisory Patent Examiner, Art Unit 3664